

# Distribution and Relative Abundance of Ruffed Grouse in Ohio<sup>1</sup>

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**ABSTRACT.** This survey updates the distribution and relative abundance of ruffed grouse (*Bonasa umbellus*) in Ohio. In 1982, ruffed grouse were reported in 44 counties covering approximately 41,400 km<sup>2</sup> in glaciated northeastern and unglaciated eastern and southeastern Ohio. About 74% of the occupied range was rated "best-good" and 26% "fair-marginal." Drumming male densities ranging from 0.7 to 3.7 per 40 ha were recorded on three "best-good" rated study areas in southeastern Ohio. From 1972 through 1983, grouse populations demonstrated dramatic low to high year changes of 75% for the rangewide grouse hunter survey and 150% for drumming male censuses in southeastern range.

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## INTRODUCTION

The ruffed grouse (*Bonasa umbellus*) occupies the sub-climax stages of forest succession and is the most widespread non-migratory native game bird in North America. The last update on its population status in Ohio was provided by Davis (1969). Based on a review of the early literature, he concluded that prior to settlement ruffed grouse probably occurred throughout the Ohio Country, but that populations may have been relatively sparse in the unbroken, closed-canopy climax forest. With the onset of settlement in the early 1800s, grouse populations apparently "exploded" in response to modification of the climax forest. As settlement quickened, massive and, in many cases, permanent removals of the virgin forest continued until the early 1900s. Grouse had disappeared from southwestern Ohio by about 1860, from central Ohio around 1900, and from north-central and northwestern Ohio around 1908 (Davis 1969). Grouse were never eliminated from Ohio's eastern Allegheny Plateau region, "although their status evidently dropped to 'uncommon' or 'rare'" (Davis 1969). During this period the ruffed grouse hunting season was reduced continually. In 1902, the season was closed, and full closure lasted for 34 of the next 36 years.

From 1900 to 1940, Ohio's forest land base continued to decline but at a much slower rate. Since then, abandonment of played-out hill farms in the Allegheny Plateau region has resulted in an increase in areas reverting to brush and forest (Dennis 1983). In response to this succession to brushland, grouse populations began a regionwide recovery.

The first map showing the modern distribution of grouse in Ohio was provided by Chapman et al. (1952). Seventeen years later, Davis (1969) updated grouse distribution and provided some idea of relative abundance. This paper reports on the distribution and relative abundance of ruffed grouse in Ohio for the early 1980s, and provides an indication of population fluctuations from 1972 to 1983.

## METHODS

**DISTRIBUTION AND RELATIVE ABUNDANCE.** We used the same procedures as Davis (1969) to construct a map showing the present distribution and relative abundance of ruffed grouse as follows: (1) In 1982, State Game Protectors from the Ohio De-

partment of Natural Resources (ODNR) rated each township within their counties according to abundance of birds; (2) diaries recording hours hunted and grouse flushed by cooperating grouse hunters for the 1979-1981 grouse hunting seasons provided a means for determining grouse distribution and for subjectively rating townships as to grouse abundance; and (3) U.S. Geological Survey topographic maps, 1:250,000 scale and revised after 1968, were examined for woodland cover—the greater the area in woodland cover, the better we considered the township for grouse. There were five ratings: (1) "Best" = majority of sections in township with fair-good habitat, some with excellent habitat and hunting. (2) "Good" = majority of sections having grouse; conditions varying as to quality of habitat, but grouse fairly common. (3) "Fair" = grouse range broken up; huntable populations in some sections, others devoid of grouse; grouse scattered. (4) "Marginal" = some sections with habitat that can maintain a few birds for some time, little or no hunting; grouse unusual or rare; and (5) "Absent" = grouse absent. On a range map (Fig. 1) these five categories were combined into three: "best-good," "fair-marginal," and "absent."

Although there was reasonably good agreement among the three procedures, final judgment as to grouse abundance was subjective; therefore, abundance ratings between counties may not be totally comparable.

**ANNUAL FLUCTUATIONS IN GROUSE ABUNDANCE.** From 1972 to 1983, billfold-size grouse hunting diaries were mailed annually to 145 to 194 cooperating hunters. Cooperators were instructed to record after each hunt the date, county, township, hours hunted, and number of grouse flushed (refluses were not counted) and harvested. A grouse hunter success index was calculated as the number of grouse flushes per hour of hunting (Stoll 1980). Standard error estimates were calculated by ratio estimation procedures (Mendenhall et al. 1971) from annual flushes and hours hunted in each county. Hunter flush rate is commonly assumed to be directly related to the fall population size for resident game birds (Overton and Davis 1969).

From 1969 to 1983, complete counts of drumming grouse were conducted on two southeastern Ohio study areas: a 1,980-ha area in Knox and Madison townships, Vinton County, and a 466-ha area in Madison Township, Jackson County. Combined results provided a spring census index for southeastern Ohio (Stoll 1980). A complete census of drumming grouse was also taken from 1981 to 1983 on a 164-ha area in Dover and York townships, Athens County. The Athens County area was not included in the male trend index, but was useful for male density comparisons.

## RESULTS AND DISCUSSION

**DISTRIBUTION AND RELATIVE ABUNDANCE.** In 1982, ruffed grouse were reported in 44 of the 88 counties in Ohio (Fig. 1). Eight of these counties (Clermont, Cuyahoga, Fairfield, Medina, Portage, Richland, Summit, and Wayne) contained only "fair-marginal" populations; the remaining counties had "best-good" rated populations in at least one or more of their townships. In the northeastern glaciated range, the major grouse range is in Ashtabula, Geauga, northern Trumbull, and southeastern Lake counties. In the un-

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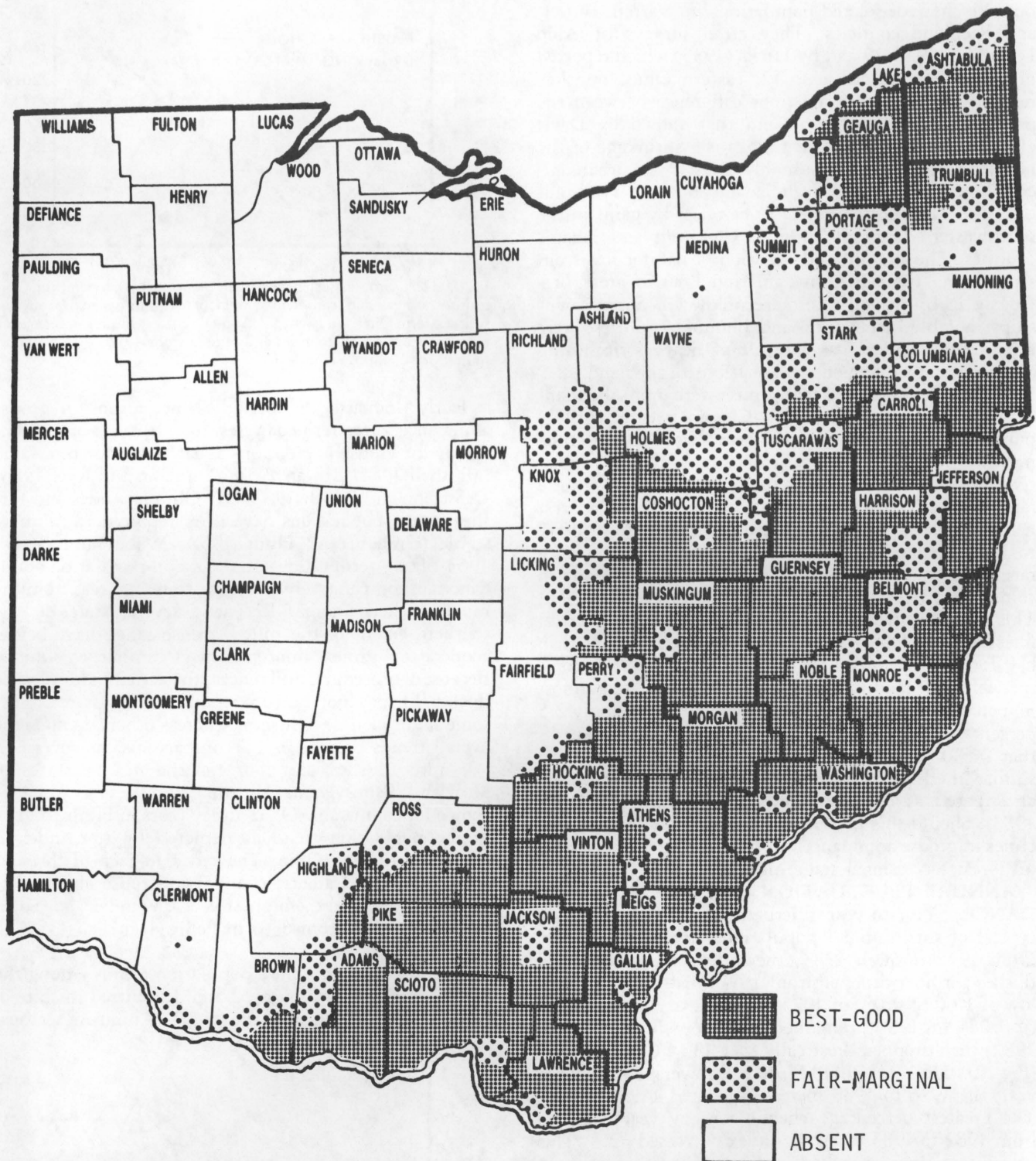


FIGURE 1. Distribution and relative abundance of Ohio ruffed grouse, 1982. See text for definitions of relative abundance.

glaciated Allegheny Plateau region, the major grouse range closely follows the line of last glaciation as shown in Braun (1961). In total, about 41,400 km<sup>2</sup> of the 106,145-km<sup>2</sup> land area of Ohio can be considered occupied grouse range. Of this occupied range about 74% was rated "best-good."

Insight on grouse density can be obtained from complete counts of drumming male grouse on three study areas in "best-good" rated townships in southeastern Ohio. For 1969–1983, spring male densities on the Vin-

ton County area varied from 0.8 to 2.3 males per 40 ha, and on the Jackson County area from 0.7 to 2.4 males per 40 ha; from 1981 to 1983 the Athens County area supported 2.5 to 3.7 males per 40 ha (unpublished data, ODNr, Division of Wildlife).

The 1982 distribution of ruffed grouse was basically the same as that reported 13 years earlier by Davis (1969) and 17 years before that by Chapman et al. (1952). The latter reported grouse in all or parts of 43 counties, primarily in northeastern, eastern, and southern Ohio,

but also showed isolated populations in Warren, Butler, and Richland counties. They cited surveys by Aldo Leopold in 1928-29 and by Hicks (1935) which reported grouse in 30 and, at least 42, eastern Ohio counties, respectively. The only apparent difference between the present grouse distribution and that shown by Davis (1969) and Chapman et al. (1952) is a shrinkage of the northeastern range, presumably caused by urban encroachment in eastern Cuyahoga and southern Trumbull counties. These losses appear to be offset by gains in the southwestern range, mainly in Clermont and Adams counties. The amount and duration of habitat loss from stripmining (post-1972 reclamation law) in areas previously in brush and forest are unknown. Some townships, notably in Harrison and Belmont counties, were rated "fair-marginal" as a result of heavy stripmining activities and subsequent reclamation to grassland.

Davis (1969) believed that grouse were more abundant in 1969 than in 1952, when Chapman et al. (1952) published the first distribution map. Based on our crude measures, there has been little detectable change in relative abundance from 1969 to the present. Grouse require fairly extensive and continuous areas of brush-forest habitat. The increase in relative abundance from 1952 to 1969, followed by essentially unchanging abundance ratings from 1969 to 1982, coincides with trends in commercial forest land area in the unglaciated region. This region contains about two-thirds of the commercial forest land of Ohio, and many counties are more than half-forested (Dennis 1983). From 1952 to 1968, commercial forest land in unglaciated Ohio increased almost 33 percent; from 1968 to 1979, the increase was only 2.5 percent (Dennis 1983). The U.S. Forest Service expects that in 30 years the area of commercial forest will be similar to that in 1979. Gains in timber volume are anticipated as current stands become older (Dennis 1983). Should this prediction come to pass, gradual declines in grouse abundance can be expected as the youthful forest successional stage matures.

**ANNUAL FLUCTUATIONS IN GROUSE ABUNDANCE.** Year-to-year fluctuations in abundance are typical of small animal populations, including grouse. From 1972 through 1983, the index of grouse hunter flushes per hour dropped from 1.64 (SE =  $\pm 0.14$ ) to a low of 1.00 ( $\pm 0.08$ ) in 1975, climbed to a high of 1.73 ( $\pm 0.08$ ) in 1980, remained relatively high through 1982, then dropped drastically to 1.13 ( $\pm 0.06$ ) in 1983 (Fig. 2). The 1972 to 1974 decrease averaged 20% per year; the 1976 to 1980 increase averaged 14% per year. The greatest percentage change for any year occurred from 1982 to 1983 when the index decreased 32%. This precipitous drop coincided with an unusually wet, cold spring, after which grouse brood trapping records, brood observations, and a limited sample of hunter-shot birds from the 1983 season showed exceptionally poor productivity (unpublished data, Division of Wildlife).

The trend in hunter flush rates is similar to the trend in drumming male numbers on our two southeastern Ohio study areas (Fig. 2). From the lows of the mid-1970s to the highs of the early 1980s, hunters saw almost 75 percent more birds per unit of effort and drumming male numbers increased more than 2.5 times. This demonstrates that grouse populations in Ohio can undergo considerable changes in abundance.

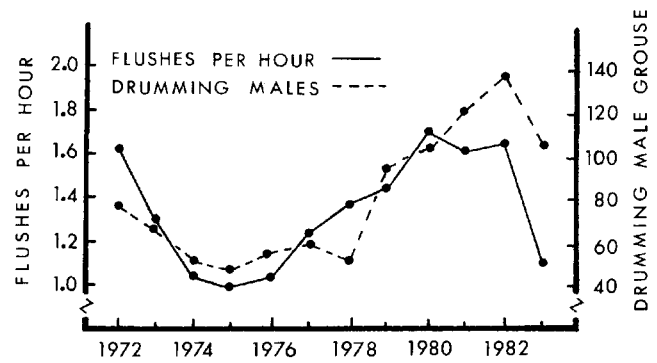


FIGURE 2. Grouse flushes per hour reported by cooperating Ohio grouse hunters and complete counts of drumming males on two southeastern Ohio study areas. Annual grouse hunter information obtained from 34-39 counties and ranged from 4,026 - 7,753 hours hunted for counties combined.

Fairly dramatic and periodic fluctuations in grouse abundance, often termed cycles, have been reported commonly for grouse populations at latitudes north of Ohio (Marshall 1954, Rowan 1954, Ammann and Ryel 1963, DeStefano and Rusch 1982). At Ohio latitudes and further south, populations have been reported to be more stable (Graham and Hunt 1958, Weber and Barick 1963). Long-term (20+ years) data on population abundance are comparatively scarce for states or areas from the more southerly range. Recently, several states at the southern extent of the ruffed grouse range have begun cooperating grouse hunter surveys similar to Ohio's. Because of procedural differences, the actual index (grouse flushes/h) may not be comparable among states (e.g., some states include reflashes, whereas others do not); the overall trends provide useful comparisons, however.

Hunter flushes per hour for the nearby states of Maryland, Pennsylvania, Virginia, and West Virginia are shown for comparable Ohio survey years in Figure 3. The grouse population trend as depicted by this index is similar to that for Ohio. The index in each of the four states reflected dramatic changes in grouse abundance. From the lowest to the highest year, the index showed an increase ranging from 63% in Pennsylvania to 138% in Maryland.

The similarity in grouse population trends among the five states shown in Figures 2 and 3 occurred in spite of considerable differences in the length of hunting seasons.

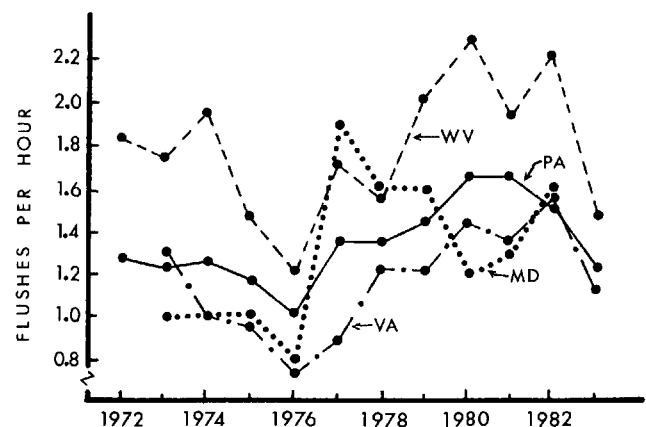


FIGURE 3. Grouse flushes per hour reported by cooperating grouse hunters in Maryland, Pennsylvania, Virginia, and West Virginia.

Pennsylvania had the shortest season, averaging 54 days from 1972 through 1982 and increasing thereafter to about 68 days. Average hunting season lengths in the remaining four states were: Virginia, 77 days; Maryland, 102 days; Ohio, 113 days; and West Virginia, 116 days. Grouse seasons started in early October in all five states except Virginia, which began in early November.

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